

OPEN AND SHUT?

Tuesday, December 12, 2006

A Conversation with Microsoft's Tony Hey

After thirty years as an academic at the UK's Southampton University, and four years in charge of the UK's e-Science Programme, last year Tony Hey surprised everyone by accepting a post as corporate vice president for technical computing at Microsoft.

Below Hey explains to Richard Poynder why he took the job, and why he believes his decision to do so is good news for the global research community and good news for the Open Access Movement.



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Unusual academic

RP: Thank you for making time to speak with me. Let's start with your background? Until joining Microsoft you were an academic who specialised in parallel computing?

TH: Well, I started out as a particle physicist, and I spent 15 years doing particle physics research, and using the whole gamut of UNIX, and tools like LaTeX.

Then in 1985 I switched to computer science and spent 20 years doing computer science in academia.

RP: You were based at the *University of Southampton*. Can you say more about your research there?

TH: My work was in *parallel processing* for scientific applications, which when I started was an area that the computer science community had neglected.

RP: You are talking about *high performance computing*?

TH: Right, or *supercomputing*: those are the names people use. My research, however, was in practical parallel computing. In the mid 1980s, for instance, I worked on the *transputer*.

RP: The *transputer* was a *concurrent computing* microprocessor developed at *INMOS* — a company funded by the UK Government right?

TH: Yes. I worked very closely with INMOS and, with other colleagues, was responsible for developing the transputer, which was in some ways ahead of its time. Today, for instance, we are seeing chips being developed that are very similar to the transputer, but appearing many years later. Had INMOS been properly funded I think the UK would have had a significant impact on the computer industry.

RP: INMOS was part of the so-called *white heat of technology* initiative instigated by the British Labour Prime Minister *Harold Wilson* in the 1960s wasn't it?

TH: Indeed. The trouble was that when the Conservatives inherited INMOS, they didn't know what to do with it, and sold it off to Thorn EMI. Thorn in its turn didn't understand that it was necessary to invest in the business. So it was a very, very exciting but brief period when the UK seemed to have the courage of its convictions, and just for a minute the country was really competitive in the field.

After the transputer I went into interoperability and portability, and parallel code. One thing I did — with some colleagues — was to write the first draft of the Message Passing Interface [MPI]. This involved a bunch of European and US people meeting

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I was also very keen, by the way, that there should be an Open Source version developed at the same time. So today there are a number of commercial versions of MPI available, plus an Open Source version. There is even a version running on Microsoft products today. I am proud of that.

RP: In total you spent thirty years at Southampton University?

TH: Right, although I had 10 years leave of absence.

RP: And you became head of the School of *Electronics and Computer Services* department?**TH:** I did, and then I was dean of engineering. So I span the gamut from physics, to computer science, to engineering. In that sense I am an unusual academic.

e-Science

RP: But your background was clearly ideal for running the UK's e-Science Programme, which you took over in 2001. What is the UK e-Science Programme?

TH: It was the brainchild of [John Taylor](#) when he was running Hewlett Packard's research labs in Europe. He had a vision in which computing would be a utility — a pay-as-you-go service similar in concept to the pay-as-you-go mobile phone services available today.

RP: Or the hosting services offered by companies like [Google](#) and [Amazon](#) (through its *S3* service)?

TH: Exactly. And of course Microsoft now offers such services too — services that are delivered in the [cloud](#): You don't care where they are stored, you just use the services.

Anyway, John was later put in charge of the UK [Research Councils](#), and he found himself working with all the physicists, the chemists, the biologists, and the medics, when they were bidding for money from the government. In fact, it was his responsibility to make those bids.

In doing so, he noticed that a lot of researchers from different institutions were collaborating to do their research, often on an international basis. The particle physics community, for instance, is a genuinely international community, and hundreds of different sites all around the world collaborate with one another.

Other research communities — for example the biologists — might want to collaborate with just a few specific sites: an institute in the UK, say, might want to collaborate with an institute in the US, and an institute in Helsinki. So these three sites would collaborate and share their data.

It was in observing this that John developed his idea of e-Science. Then, when I took over the Programme, it became my task to define it.

RP: So how do you define *e-Science*?

TH: Well, the first point to make is that it's not a science like biology or chemistry. Rather, it is a set of technologies to enable people to collaborate: to share computing, to share data, and to share the use of remote instruments etc. So e-Science is the technologies that allow networked, distributed, collaborative, multi-disciplinary science. It's a very exciting area.

RP: How does e-Science differ from what in the US is called the cyberinfrastructure. Or are we talking about the same thing?

TH: Essentially we are talking about the same thing. In fact I had [Paul Messina](#) — who was on the US cyberinfrastructure [Blue-Ribbon Advisory Panel](#) — on my steering committee; and John Taylor and I were both interviewed by the Blue-Ribbon Panel. So you will see a lot of e-Science ideas in the US cyberinfrastructure report, and you will see a lot of the US cyberinfrastructure report in what we developed. It just happens that in the US they chose another name. Personally, I think e-Science is a much better name than cyberinfrastructure.

RP: Why?

TH: Because it emphasises science. The purpose isn't to build roads and infrastructure, but to do science. Of course, e-Science depends on the cyberinfrastructure — the networks, the software, and so on, which we in Europe call

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application led.

RP: *You mean that the emphasis has been on what scientists actually want to do, not the technology?*

TH: Exactly. Too often these things are dominated by the technology. And what I really, really liked about the e-Science Programme (and I didn't set it up that way, John Taylor deserves the credit) is that I was only running about 20% of the budget. That is, I ran the core of the Programme, the part that was needed to underpin all the application projects — and the remaining 80% was application-led.

So it was my responsibility to develop the **middleware** requirements to support the R&D projects, and the applications themselves were directly funded. This meant that the applications were really great, and that is why the e-Science Programme became so visible around the world.

So I believe we had the right idea. The aim was to do serious science, and to tackle next-generation scientific problems.

RP: *Can you give me an example of e-Science in action?*

TH: There are many examples. At one end you have particle physics, where physicists need to share their compute clusters to analyse the data that will soon be generated by the **LHC machine** in **CERN**, Geneva. At the other end are astronomers who want to share data from different telescopes all over the world ...

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